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AN ORDINANCE relating to the 1997 Seattle Mechanical Code, Chapter 22.400 of the Seattle Municipal Code, as adopted by Ordinance 119080: amending Sections 117; 406; 507; 508; 901; and Tables 4-B and 4-D; adding Table 4-F; and repealing Section 1312.20.

Section 1. Subsection 117.1 of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is amended as follows:

117.1 Issuance.

117.1.1 General. The application, plans, specifications, and other data filed by an applicant for permit shall be reviewed by the building official. Such plans may be reviewed by other departments of the City to check compliance with the laws and ordinances under their jurisdiction. If the building official finds that the work as described in an application for a permit and the plans, specifications and other data filed therewith substantially conforms to the requirements of this code and other pertinent laws and ordinances and that the fees specified in the Fee Subtitle have been paid, the building official shall issue a permit therefor to the applicant who becomes the permit holder or authorized agent.

EXCEPTION: The building official may issue a permit for the construction of part of a building or structure before complete plans for the whole building or structure have been submitted or approved, provided that the proposed project complies with the State Environmental Policy Act as adopted by the City (Chapter 25.05 Seattle Municipal Code) and as amended and the Land Use Code as amended; and provided further that adequate information and plans have been filed and checked to assure compliance with all pertinent requirements of this and other pertinent codes. The holder of such a permit shall proceed at his/her own risk without assurance that the permit for the entire building or structure will be granted.

117.1.2 Compliance with approved plans and permit. When the building official issues a permit, the building official shall endorse the permit in writing and endorse in writing or stamp the plans "APPROVED." Such approved plans and permit shall not be changed, modified or altered without authorization from the building official, and all work shall be done in accordance with the approved plans and permit except as the building official may require during field inspection to correct errors or omissions.

117.1.3 Amendments to the permit. When substitutions or changes are made during construction, approval shall be secured prior to execution, however, the building inspector may approve minor modifications for work not reducing the structural strength and fire and life safety of the structure. The building inspector shall determine if it is necessary to revise the approved plans. These substitutions and changes shall conform to the requirements of this code and other pertinent laws and ordinances. Minor substitutions or changes shall be documented, but shall not incur additional fees if these substitutions and/or changes do not (1) add to the general scope of work; (2) change the basic design concept; (3) involve major relocation of equipment, ducts, or pipes; (4) substantially alter approved equipment size; (5) require extensive re-review of the plans and specifications.

All other changes, substitutions, or clarifications shall be shown on two sets of plans which shall be submitted to and approved by the building official prior to execution or

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occupancy. These submittals shall be accompanied by appropriate fees as specified in the Fee Subtitle prior to issuance of the Certificate of Occupancy.

117.1.4 Cancellation of permit application. ~~((An application shall be deemed abandoned and void if a permit is not issued after a period of sixty days from the date of notice of approval for issuance or if corrections are not received after a period of sixty days from the date of notification of required corrections; provided that the building official may extend the period for issuance or submission of corrections if it is determined that there are good reasons for the delay, such as litigation or appeals or if a different schedule is agreed upon in writing before the end of the sixty day period. If the permit application is canceled, the site may be inspected to verify that no work has taken place. The application and any accompanying plans and specifications shall be destroyed. If the application is being reviewed concurrently with a master use permit application, and is for a project vested to a prior Land Use Code, and the project does not conform with the codes in effect while it is being reviewed, cancellation of the building permit application under the provisions of this section shall cause the concurrent cancellation of the Master Use Permit application.))~~
Applications shall expire if no permit is issued by the earlier of the following: (1) within twelve months following the date of application; or (2) within sixty days from the date of written notice of approval for issuance. Plans and other data submitted for review may thereafter be returned to the applicant or destroyed by the building official.

At the discretion of the building official, applications for projects that require more than twelve months to complete may be extended for a period that provides reasonable time to complete the work, but in no case longer than twenty-four months from the date of application. Requests for extension shall be made at least thirty days before expiration of the application. No application shall be extended more than once. In order to renew action on an application after expiration, the applicant shall submit a new application and pay a new fee.

Notwithstanding other provisions of this code, applications may be extended where issuance of the permit is delayed by litigation, preparation of environmental impact statements, appeals, strikes, or other causes related to the application that are beyond the applicant's control.

The building official shall notify the applicant in writing at least thirty days before the application is due to expire.

See the Fee Subtitle for fee refunds.

Section 2. Subsection 406.1 of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is amended as follows:

NOTE: Section 406 is based on the Washington State Ventilation and Indoor Air Quality Code, WAC 51-13.

406.1 SCOPE AND GENERAL REQUIREMENTS

406.1.1 Purpose. The purpose of Section 406 is to provide minimum standards for the design and installation of mechanical ventilation systems.

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It is intended that these provisions provide flexibility to permit the use of innovative approaches and techniques. These provisions are structured to permit compliance with the intent of Section 406 by demonstration of performance through on-site testing or through engineered design. Section 406 is not intended to abridge any safety or health requirements required under any other applicable codes or ordinances.

406.1.2 Scope. Section 406 sets forth minimum requirements for ventilation in all occupancies, including the design of new construction.

~~((406.2))~~ 406.1.3 Application to Existing Buildings

~~((406.2.1))~~ 406.1.3.1 Additions to Existing Buildings. Additions to existing buildings or structures may be made without making the entire building comply, provided that the new addition shall conform to the provisions of Section 406.

EXCEPTION: Additions with less than 500 square feet of conditioned floor area are exempt from the requirements in Section 406.3.3 for whole house ventilation systems.

Foundations, crawlspaces, slabs, or basements shall not be required to meet the requirements for radon protection.

~~((406.2.2))~~ 406.1.3.2 Alterations and Repairs. All alterations and repairs may be made to existing buildings or moved buildings built or permitted prior to ~~((the enforcement of Section 406))~~ July 1, 1991 without making the entire building comply with the provisions of Section 406, provided the alterations or repairs comply with Section 406.

EXCEPTION: Air handling/conditioning equipment, which is being replaced without alteration or repair of the associated air distribution system is exempt from the requirements of Section 406.

~~((406.2.3))~~ 406.1.3.3 Historic Buildings. Historic buildings or structures, as described in Section 104.6, are exempt from Section 406 only to the extent necessary to preserve those features essential to their historical appearance or function.

406.1.4 Operating Instructions. Installers shall provide the manufacturer's installation, operating instructions, and a whole house ventilation system operation description.

406.1.5 Testing. At the discretion of the building official, flow testing may be required to verify that the mechanical system satisfies the requirements of this section. Flow testing may be performed using flow hoods measuring at the intake or exhaust points of the system, in-line pitot tube, or pitot-transverse type measurement systems in the duct, short term tracer gas measurements, or other means approved by the building official.

Section 3. Subsection 406.3 of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is amended as follows:

406.3 ~~((MINIMUM))~~ MECHANICAL VENTILATION CRITERIA USING PERFORMANCE OR DESIGN METHODS FOR ~~((ALL))~~ GROUP R OCCUPANCIES

406.3.1 ~~((General))~~ Applicability. ~~((Section 406.3 shall apply to all))~~ Group R occupancies as defined by the Building Code shall comply with either this section 406.3 or Section 406.4. ~~((For source specific ventilation requirements, see Section 406.3.2.1.))~~

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406.3.1.1 Compliance by Calculations or Testing. Compliance with Section 406.3 shall be demonstrated through engineering calculations or performance testing. Documentation of calculations shall be submitted to the building official where required. Performance testing shall be conducted in accordance with recognized test methods.

~~((At the discretion of the building official, flow testing may be required to verify that the mechanical system(s) satisfies the requirements of this Section 406. Flow testing may be performed using flow hoods measuring at the intake or exhaust points of the system, in-line pitot tube, or pitot-traverse type measurement systems in the duct, short term tracer gas measurements or other means approved by the building official.~~

406.3.2) 406.3.1.2 Minimum Ventilation Performance. Each dwelling unit or guest room shall be equipped with source specific and whole house ventilation systems designed and installed to satisfy the ventilation requirements of Section 406.3.

~~((EXCEPTION:))~~ All public corridors shall meet the ventilation requirements in Section 1203.3 of the Building Code.

406.3.2 Source Specific Ventilation Requirements.

406.3.2.1 Source Specific Ventilation. Source specific exhaust ventilation ~~((shall be))~~ is required in each kitchen, bathroom, water closet, laundry room, indoor swimming pool, spa, and other rooms where excess water vapor or cooking odor is produced.

The minimum source specific ventilation effective exhaust capacity shall be not less than levels specified in Table 4-A.

406.3.2.2 Source Specific Ventilation Controls. Source specific ventilation systems shall be controlled by manual switches, dehumidistats, timers, or other approved means. Source specific ventilation system controls shall be readily accessible.

406.3.2.3 Source Specific Ventilation Ducts. Source specific ventilation ducts shall terminate outside the building. Exhaust ducts in systems designed to operate intermittently shall be equipped with back-draft dampers. All exhaust ducts in unconditioned spaces shall be insulated to a minimum of R-4. Terminal elements shall have at least the equivalent net free area of the duct work. Terminal elements for exhaust fan duct systems shall be screened or otherwise protected from entry by leaves or other material.

406.3.3 Requirements for Whole House Ventilation Systems.

~~((406.3.2.2))~~ **406.3.3.1 Whole House Ventilation Systems.** Each dwelling unit shall be equipped with a whole house ventilation system which shall be capable of providing ~~((at least 0.35 air changes per hour, but not less than 15 cubic feet per minute (7 L/s) per bedroom plus an additional 15 cubic feet per minute (7 L/s). Whole house ventilation systems shall be designed to limit ventilation to a level no greater than 0.5 air changes per hour))~~ the volume of outdoor air specified in Table 4-B under normal ~~((operation))~~ operating conditions. ~~((Whole house ventilation systems shall supply outside air to all habitable rooms through individual outside air inlets, forced air heating system, ducting or equivalent means. Doors and operable lites in windows are deemed not to meet the outside air supply intake requirements.))~~

EXCEPTION: ~~((For dwelling units of no more than 1400 square feet (130 m²), the maximum ventilation rate shall be 0.65 air changes per hour))~~ Maximum flow rates listed in Table 4-B do not apply to heat recovery ventilation systems.

406.3.3.2 Whole House Ventilation System Controls. All ventilation system controls shall be readily accessible. Controls for whole house ventilation systems shall be capable of operating the ventilation system without energizing other energy-consuming appliances.

~~((EXCEPTION: Continuously operated whole house ventilation systems switches shall not be readily accessible by the occupant.~~

~~**406.3.3.1 Source Specific Ventilation Systems.** Source specific ventilation systems shall be controlled by manual switches, dehumidistats, timers or other approved means.~~

~~**406.3.3.2 Intermittently Operated Whole House Ventilation Systems.** The))~~
Intermittently operated whole house ventilation systems shall be constructed to have the capability for continuous operation, and shall have a manual control and an automatic control, such as a clock timer. At the time of final inspection, the automatic control timer shall be set to operate the whole house fan for ~~((a minimum of))~~ at least eight hours a day. A label shall be affixed to the control that reads "Whole House Ventilation (see operating instructions)."

~~((406.3.4))~~ **406.3.3.3 Fan Noise.** Whole house fans located four feet (1219 mm) or less from the interior grille shall have a sone rating of 1.5 or less measured at 0.1 inches water gage. Manufacturer's noise ratings shall be determined as per HVI 915 (October 1995). Remotely mounted fans shall be acoustically isolated from the structural elements of the building and from attached duct work using insulated flexible duct or other approved material.

EXCEPTION: Whole house ventilation systems which are integrated with forced-air heating systems or heat-recovery ventilation systems are exempt from the sone rating requirements of this section.

~~((406.3.5))~~ **406.3.3.4 Whole House Ventilation Ducts.** All ducts shall terminate outside the building. Exhaust ducts in systems which are designed to operate intermittently shall be equipped with back-draft dampers. All exhaust ducts in unconditioned spaces shall be insulated to a minimum of R-4. All supply ducts in the conditioned space shall be insulated to a minimum of R-4. For all other ducts, see the Seattle Energy Code.

406.3.3.5 Outside Air.

~~((406.3.6))~~ **406.3.3.5.1 Outside Air Supply.** A mechanical system shall supply outside air as required in Section ~~((406.3.2))~~ 406.3.3.1. The mechanical system may consist of exhaust fans, supply fans, or both.

~~((406.3.6.1))~~ **406.3.3.5.2 Outside Air Inlets.** Inlets shall be screened or otherwise protected from entry by ~~((insects,))~~ leaves, or other material. Outside air inlets shall be located so as not to take air from the following areas:

1. Closer than 10 feet (3048 mm) from an appliance vent outlet, unless such vent outlet is 3 feet (914 mm) above the outside air inlet.

2. Where it will pick up objectionable odors, fumes or flammable vapors.

3. A hazardous or unsanitary location.

4. A room or space having any fuel-burning appliances therein.

5. Closer than 10 feet (3048 mm) from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet (914 mm) above the air inlet.

6. Attics, crawl spaces or garages.

406.3.3.5.3 Outside Air Distribution. Outside air shall be distributed to each habitable room by means such as individual inlets, separate duct systems, or a forced-air system. Where outside air supplies are separated from exhaust points by doors, provisions shall be made to ensure air flow by installation of distribution ducts, undercutting doors, installation of grilles, transoms, or similar means where permitted by the Building Code. Doors shall be undercut to a minimum of one-half inch above the surface of the finish floor covering.

Doors and operable lites in windows are deemed not to meet the outside air supply intake requirements.

406.3.3.5.4 Individual Room Outside Air Inlets. Where provided, individual room outside air inlets shall:

1. Have controllable and secure openings; and
2. Be sleeved or otherwise designed so as not to compromise the thermal and weather resistive properties of the wall or window in which they are placed(;
3. Provide not less than 4 square inches (2581 mm²) of net free area of opening for each habitable space. Any inlet or combination of inlets which provide 10 cfm (5 L/s) at 10 pascals as determined by the Home Ventilating Institute Air Flow Test Standard is deemed equivalent to 4 square inches (2581 mm²) net free area)).

~~((406.3.6.2))~~ **406.3.3.5.5 Ventilation Integrated with Forced-Air Systems.** Where outside air is provided by a forced-air system, the outside air connection to the return air stream shall be located upstream of the forced-air system blower and shall not be connected directly into a furnace cabinet to prevent thermal shock to the heat exchanger.

~~((406.3.6.3 Distribution. Outside air shall be distributed to each habitable room by individual inlets, separate duct systems, or a forced-air system. Where outside air supplies are separated from exhaust points by doors, provisions shall be made to ensure air flow by installation of distribution ducts, undercutting doors, installation of grilles, transoms, or similar means where permitted by the Building Code. Doors shall be undercut to a minimum of one-half inch above the surface of the finish floor covering.))~~

Section 4. Subsection 406.4 of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is amended as follows:

406.4 MECHANICAL VENTILATION CRITERIA ((AND MINIMUM VENTILATION PRESCRIPTIVE REQUIREMENTS)) USING PRESCRIPTIVE METHODS FOR ((ALL)) GROUP R OCCUPANCIES

406.4.1 ((General)) Applicability. Group R Occupancies shall comply with Section 406.3 or Section 406.4. Section 406.4 establishes minimum prescriptive design requirements for intermittently operated systems. Continuously operated systems shall comply with Section 406.3. ((System characteristics not addressed in the following sections shall comply with Section 406.3.)) A system which meets the requirements of Section 406.4 shall be deemed to satisfy the requirements of Section 406.

406.4.2 Minimum Ventilation Performance. Each dwelling unit or guest room shall be equipped with source specific and whole house ventilation systems designed and installed to satisfy the ventilation requirements of this section. All public corridors shall meet the ventilation requirements in Section 1203.3 of the Building Code.

406.4.3 Source Specific Exhaust Ventilation Requirements.

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406.4.3.1 Source Specific Ventilation. Source specific exhaust is required in each kitchen, bathroom, water closet, laundry room, indoor swimming pool, spa, and other rooms where excess water vapor or cooking odor is produced. The minimum source specific ventilation effective exhaust capacity shall be not less than levels specified in Table 4-A.

406.4.3.2 Source Specific Exhaust Fans. Exhaust fans providing source specific ventilation shall have a minimum fan flow rating not less than 50 cfm (24 L/s) at 0.25 inches water gage for bathrooms, laundries or similar rooms and 100 cfm (47 L/s) at 0.25 inches water gage for kitchens. Manufacturers' fan flow ratings shall be determined as per HVI ((Standard No.)) 916 (((July 1989))) April 1995) or AMCA ((Standard No.)) 210.

EXCEPTION: Where a range hood or down draft exhaust fan is used to satisfy the source specific ventilation requirements for kitchens, the range hood or down draft exhaust shall not be less than 100 cfm (47 L/s) at 0.10 inches water gage.

~~((406.4.3 Whole House. Whole house ventilation systems may consist of whole house exhaust, integration with forced air systems or dedicated heat recovery ventilation systems. Whole house ventilation systems shall provide ventilation capacity as specified in Table 4 B and meet the following requirements:~~

~~1. Exhaust fans providing whole house ventilation shall have a flow rating at 0.25 inches water gage as specified in Table 4 B. Manufacturers' fan flow ratings shall be determined as per HVI Standard No. 916 (July 1989) or AMCA Standard No. 210. Table 4-B shall not be used for dwelling units with more than five bedrooms.~~

~~2.)) Integrated forced air ventilation systems shall have an outside air inlet duct connecting a terminal element on the outside of the building to the return air plenum of the forced air system, at a point within 4 feet (1218 mm) upstream of the air handler, and be equipped with one of the following:~~

~~2.1. A motorized damper connected to the automatic ventilation control as specified in Section 406.3.3; or~~

~~2.2. A damper installed and set to meet measured flow rates as specified in Table 4 B, by either field testing or following manufacturers' installation instructions based on site conditions; or~~

~~2.3. An automatic flow regulated device with field measured or field calculated minimum negative pressure differential of 0.07 inches water gage at the point where the outside air duct is connected to the return air plenum.~~

~~3. All duct work in heat recovery ventilation systems shall be not less than 6 inch (152 mm) diameter. Balancing dampers shall be installed on the inlet and exhaust side. Flow measurement grids shall be installed on the supply and return. System minimum flow rating shall be not less than that specified in Table 4 B. Maximum flow rates in Table 4 B do not apply to heat recovery ventilation systems.~~

406.4.4 Source Specific and Whole House Exhaust Ducts. Exhaust ducts shall meet all requirements of Section 406.3.5. Duct diameter, length and number of elbows for exhaust fans shall be as specified in Table 4 C. Terminal elements for exhaust fan duct systems shall have at least the equivalent net free area of the duct work. Duct diameter, length, and number of elbows for integrated forced air systems shall be as specified in Table 4 D. Terminal elements for integrated systems shall be the same size as the connecting ductwork or 8 inches (203 mm) in diameter, whichever is greater.))

406.4.3.3 Source Specific Ventilation Controls. Source specific ventilation systems shall be controlled by manual switches, dehumidistats, timers, or other approved means. Source specific ventilation system controls shall be readily accessible.

406.4.3.4 Source Specific Ventilation Ducts. Source specific ventilation ducts shall terminate outside the building. Exhaust ducts shall be equipped with back-draft dampers. All exhaust ducts in unconditioned spaces be insulated to a minimum of R-4. Terminal elements shall have at least the equivalent net free area of the duct work. Terminal elements for exhaust fan duct systems shall be screened or otherwise protected from entry by leaves or other material.

406.4.4 Prescriptive Whole House Ventilation Systems. Whole house ventilation shall be provided by a system that meets the requirements of either Section 406.4.4.1, 406.4.4.2, 406.4.4.3, or 406.4.4.4. A system that meets all of the requirements of one of these sections shall be deemed to satisfy the requirements for a whole house ventilation system.

406.4.4.1 Intermittent Whole House Ventilation Using Exhaust Fans. This section establishes minimum prescriptive requirements for intermittent whole house ventilation systems using exhaust fans. A system that meets all the requirements of this section shall be deemed to satisfy the requirements for a whole house ventilation system.

406.4.4.1.1 Whole House Ventilation Fans. Exhaust fans providing whole house ventilation shall have a flow rating at 0.25 inches water gage as specified in Table 4-B. Manufacturers' fan flow ratings shall be determined according to HVI 916 (April 1995) or AMCA 210.

406.4.4.1.2 Fan Noise. Whole house fans located four feet (1219 mm) or less from the interior grille shall have a sone rating of 1.5 or less measured at 0.1 inches water gage. Manufacturer's noise ratings shall be determined as per HVI 915 (October 1995). Remotely mounted fans shall be acoustically isolated from the structural elements of the building and from attached duct work using insulated flexible duct or other approved material.

406.4.4.1.3 Fan Controls. The whole house ventilation fan shall be controlled by a 24-hour clock timer with the capability of continuous operation, manual and automatic control. The 24-hour timer shall be readily accessible. The 24-hour timer shall be capable of operating the whole house ventilation fan without energizing other energy-consuming appliances. At the time of final inspection, the automatic control timer shall be set to operate the whole house fan for at least eight hours a day. A label shall be affixed to the control that reads "Whole House Ventilation (see operating instructions)."

406.4.4.1.4 Exhaust Ducts. All exhaust ducts shall terminate outside the building. Exhaust ducts shall be equipped with back-draft dampers. All exhaust ducts in unconditioned spaces shall be insulated to a minimum of R-4.

406.4.4.1.5 Outside Air Inlets. Outside air shall be distributed to each habitable room by individual outside air inlets. Where outside air supplies are separated from exhaust points by doors, provisions shall be made to ensure air flow by installation of distribution ducts, undercutting doors, installation of grilles, transoms, or similar means where permitted by the Building Code. Doors shall be undercut to a minimum of one-half inch above the surface of the finish floor covering.

Individual room outside air inlets shall:

1. Have controllable and secure openings;

2. Be sleeved or otherwise designed so as not to compromise the thermal and weather resistive properties of the wall or window in which they are placed; and

3. Provide not less than 4 square inches (2581 mm²) of net free area of opening for each habitable space. Any inlet or combination of inlets that provide 10 cfm (5 L/s) at 10 Pascals as determined by the Home Ventilating Institute Air Flow Test Standard (HVI 901, November 1996) are deemed equivalent to 4 square inches (2581 mm²) net free area.

Inlets shall be screened or otherwise protected from entry by leaves or other material. Outside air inlets shall be located so as not to take air from the following areas:

1. Closer than 10 feet (3048 mm) from an appliance vent outlet, unless such vent outlet is 3 feet (914 mm) above the outside air inlet.

2. Where it will pick up objectionable odors, fumes or flammable vapors.

3. A hazardous or unsanitary location.

4. A room or space having any fuel-burning appliances therein.

5. Closer than 10 feet (3048 mm) from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet (914 mm) above the air inlet.

6. Attics, crawl spaces or garages.

EXCEPTION: Exhaust only ventilation systems do not require outdoor air inlets if the home has a ducted forced-air heating system that communicates with all habitable rooms and the interior doors are undercut to a minimum of one-half inch above the surface of the finish floor covering.

406.4.4.2 Prescriptive Requirements for Intermittent Whole House Ventilation

Integrated with a Forced-Air System. This section establishes minimum prescriptive requirements for intermittent whole house ventilation systems integrated with forced-air ventilation systems. A system that meets all of the requirements of this section shall be deemed to satisfy the requirements for a whole house ventilation system.

406.4.4.2.1 Integrated Whole House Ventilation Systems: Integrated Whole House Ventilation Systems shall provide outdoor air at the rates specified in Table 4-B. Integrated Forced-Air Ventilation Systems shall distribute outdoor air to each habitable room through the forced-air system ducts. Integrated Forced-Air Ventilation Systems shall have an outside air inlet duct connecting a terminal element on the outside of the building to the return air plenum of the forced-air system, at a point within 4 feet (1219 mm) upstream of the air handler. The outdoor air inlet duct connection to the return air stream shall be located upstream of the forced-air system blower and shall not be connected directly into a furnace cabinet to prevent thermal shock to the heat exchanger. The outside air inlet duct shall be prescriptively sized in accordance with Table 4-E. The system will be equipped with one of the following:

1. A motorized damper connected to the automatic ventilation control as specified in Section 406.4.4.2.2;

2. A damper installed and set to meet measured flow rates as specified in Table 4-B, by either field testing or following manufacturers' installation instructions based on site conditions; or

3. An automatic flow regulated device with field measured or field calculated minimum negative pressure differential of 0.07 inches water gage at the point where the outside air duct is connected to the return air plenum.

406.4.4.2.2 Ventilation Controls. The whole house ventilation system shall be controlled by a 24-hour clock timer with the capability of continuous operation, manual, and automatic control. This control will control the forced-air system blower and if applicable the automatic damper. The 24-hour timer shall be readily accessible. The 24-hour timer shall be capable of operating the whole house ventilation system without energizing other energy-consuming appliances. At the time of final inspection, the automatic control timer shall be set to operate the whole house system for at least eight hours a day. A label shall be affixed to the control that reads "Whole House Ventilation (see operating instructions)."

406.4.4.2.3 Ventilation Duct Insulation. All supply ducts in the conditioned space shall be insulated to a minimum of R-4.

406.4.4.2.4 Outside Air Inlets. Inlets shall be screened or otherwise protected from entry by leaves, or other material. Outside air inlets shall be located so as not to take air from the following areas:

1. Closer than 10 feet (3048 mm) from an appliance vent outlet, unless such vent outlet is 3 feet (914 mm) above the outside air inlet.
2. Where it will pick up objectionable odors, fumes or flammable vapors.
3. A hazardous or unsanitary location.
4. A room or space having any fuel-burning appliances therein.
5. Closer than 10 feet (3048 mm) from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet (914 mm) above the air inlet.
6. Attics, crawl spaces or garages.

406.4.4.3 Prescriptive Requirements for Intermittent Whole House Ventilation Using a Supply Fan. This section establishes minimum prescriptive requirements for whole house ventilation systems using an inline supply fan. A system that meets all the requirements of this section shall be deemed to satisfy the requirements for a whole house ventilation system.

406.4.4.3.1 Outside Air. Supply Fan Ventilation Systems shall distribute outside air to each habitable room through the forced-air system ducts or through dedicated ducts to each habitable room. Supply fans shall have the capacity to provide the amount of outdoor air specified in Table 3-2 at 0.4 inches water gage as per HIV Standard No. 916 (April 1995). The outside air must be filtered before it is delivered to habitable rooms. The filter may be located at the intake device, inline with the fan, or, in the case of a connection to the return plenum of the air handler, using the furnace filter. An outside air inlet shall be connected to either the supply or return air stream.

406.4.4.3.2 Ducts. An outside air inlet duct connection to the supply air stream shall be located downstream of the forced-air system blower. An outside air inlet duct connection to the return air stream shall be located at least 4 feet (1218 mm) upstream of the forced-air system blower and its filter. Neither type of duct shall be connected directly into a furnace cabinet to prevent thermal shock to the heat exchanger. The outdoor air inlet duct shall be prescriptively sized in accordance with Table 4-F. The terminal element on the outside of the building shall be sized 2 inches (51 mm) in diameter larger than the outside air inlet duct.

406.4.4.3.3 Dampers. The system shall be equipped with a back-draft damper and one of the following:

1. A calibrated manual volume damper installed and set to meet the measure flow rates specified in Table 4-B by field testing with a pressure gauge and/or following manufacturer's installation instruction;

2. A manual volume damper installed and set to meet the measured flow rates specified in Table 4-B by field testing with a flow hood or a flow measuring station; or

3. An automatic flow-regulating device sized to the specified flow rates in Table 4-B that provides constant flow over a pressure range of 0.2 to 0.6 inches water gage.

406.4.4.3.4 Ventilation Controls. The whole house ventilation system shall be controlled by a 24-hour clock timer with the capability of continuous operation, manual, and automatic control. This control shall control the inline supply fan. The 24-hour timer shall be readily accessible. The 24-hour timer shall be capable of operating the whole house ventilation system without energizing other energy-consuming appliances. At the time of final inspection, the automatic control timer shall be set to operate the whole house system for at least eight hours a day. A label shall be affixed to the control that reads "Whole House Ventilation (see operating instructions)."

406.4.4.3.5 Ventilation Duct Insulation. All supply ducts in the conditioned space shall be insulated to a minimum of R-4.

406.4.4.3.6 Outside Air Inlets. Inlets shall be screened or otherwise protected from entry by leaves, or other material. Outside air inlets shall be located so as not to take air from the following areas:

1. Closer than 10 feet (3048 mm) from an appliance vent outlet, unless such vent outlet is 3 feet (914 mm) above the outside air inlet.

2. Where it will pick up objectionable odors, fumes or flammable vapors.

3. A hazardous or unsanitary location.

4. A room or space having any fuel-burning appliances therein.

5. Closer than 10 feet (3048 mm) from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet (914 mm) above the air inlet.

6. Attics, crawl spaces or garages.

406.4.4.4 Prescriptive Requirements for Intermittent Whole House Ventilation Using a Heat Recovery Ventilation System. This section establishes minimum prescriptive requirements for intermittent whole house ventilation using a heat recovery ventilation system.

406.4.4.4.1 Heat Recovery Ventilation Systems. All duct work in heat recovery ventilation systems shall not be less than 6 inches (152 mm) in diameter. Balancing dampers shall be installed on the inlet and exhaust side. Flow measurement grids shall be installed on the supply and return. System minimum flow rating shall not be less than that specified in Table 4-B. Maximum flow rates in Table 4-B do not apply to heat recovery ventilation systems.

406.4.4.4.2 Ventilation Controls. The whole house ventilation system shall be controlled by a 24-hour clock timer with the capability of continuous operation, manual and automatic control. This control will control the inline supply fan. The 24-hour time shall be readily accessible. The 24-hour timer shall be capable of operating the whole house ventilation system without energizing other energy-consuming appliances. At the time of final inspection, the automatic control timer shall be set to operate the whole house system for at

least eight hours a day. A label shall be affixed to the control that reads “Whole House Ventilation (see operating instructions).”

406.4.4.3 Ventilation Duct Insulation. All supply ducts in the conditioned space installed upstream of the heat exchanger shall be insulated to a minimum of R-4.

406.4.4.4 Outside Air Inlets. Inlets shall be screened or otherwise protected from entry by leaves or other material. Outside air inlets shall be located so as not to take air from the following areas:

1. Closer than 10 feet (3048 mm) from an appliance vent outlet, unless such vent outlet is 3 feet (914 mm) above the outside air inlet.

2. Where it will pick up objectionable odors, fumes or flammable vapors.

3. A hazardous or unsanitary location.

4. A room or space having any fuel-burning appliances therein.

5. Closer than 10 feet (3048 mm) from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet (914 mm) above the air inlet.

6. Attics, crawl spaces or garages.

Section 5. Subsection 406.5 of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is amended as follows:

406.5 Mechanical Ventilation Criteria and Minimum Ventilation Performance for All Occupancies Other than Group R. Where a mechanical ventilation system is installed in occupancies other than Group R, the system shall be capable of supplying ventilation air to each zone with the minimum outside air quantities specified in Table 4-E.

EXCEPTION: Where occupant density is known and documented in the plans, the outside air rate may be based on the design occupant density. Under no circumstance shall the occupancies used result in outside air less than one-half that resulting from application of Table 4-E estimated maximum occupancy values.

Outside air shall be ducted in a fully enclosed path directly to every air handling unit in each zone not provided with sufficient openable area for natural ventilation.

EXCEPTION: Ducts may terminate within 12 inches (305 mm) of the intake to an HVAC unit provided they are physically fastened so that the outside air duct is directed into the unit intake.

In all parking garages, other than open parking garages as defined in Building Code Section 311.9, used for storing or handling of automobiles operating under their own power and on all loading platforms in bus terminals, ventilation shall be provided at 1.5 cfm per square foot (.71 L/s per m²) of gross floor area. The building official may approve an alternate ventilation system designed to exhaust a minimum 14,000 cfm (6607 L/s) for each operating vehicle. Such system shall be based on the anticipated instantaneous movement rate of vehicles but not less than 2.5 percent (or one vehicle) of the garage capacity. Automatic carbon monoxide sensing systems may be submitted for approval.

In all buildings used for the repair of automobiles, each repair stall shall be equipped with an exhaust extension duct, extending to the outside of the building, which if over 10 feet (3048 mm) in length, shall mechanically exhaust 300 cfm (142 L/s). Connecting offices and waiting rooms shall be supplied with conditioned air under positive pressure.

To consider higher occupant densities, desires for higher outside air quantities per person, and HVAC systems with a ventilation effectiveness of less than 100%, the maximum total air quantities used as the basis for calculating heating and cooling design

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loads and for sizing HVAC equipment shall not exceed three times the quantities specified in Table 4-E.

The minimum area of openable exterior openings to provide natural ventilation is specified in Chapter 12 of the Seattle Building Code.

Combustion air requirements shall conform to the requirements of Chapter 7 of the Seattle Mechanical Code.

Mechanical refrigerating equipment and rooms storing refrigerants shall conform to the requirements of Chapter 11 of the Seattle Mechanical Code.

Section 6. Table 4-B of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is amended as follows:

TABLE 4-B—(WHOLE HOUSE VENTILATION FLOW REQUIREMENTS⁴)

Bedrooms	CFM	
	Minimum	Maximum
2 or less	50	75
3	80	120
4	100	150
5	120	180

⁴ This table shall not be used for dwelling units containing more than 5 bedrooms.)

VENTILATION RATES FOR ALL GROUP R OCCUPANCIES¹

Minimum and Maximum Ventilation Rates: Cubic Feet per Minute (CFM)

Floor Area ² , ft ²	Number of Bedrooms													
	2 or less		3		4		5		6		7		8	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
<500	50	75	65	98	80	120	95	143	110	165	125	188	140	210
501-1000	55	83	70	105	85	128	100	150	115	173	130	195	145	218
1001-1500	60	90	75	113	90	135	105	158	120	180	135	203	150	225
1501-2000	65	98	80	120	95	143	110	165	125	188	140	210	155	233
2001-2500	70	105	85	128	100	150	115	173	130	195	145	218	160	240
2501-3000	75	113	90	135	105	158	120	180	135	203	150	225	165	248
3001-3500	80	120	95	143	110	165	125	188	140	210	155	233	170	255
3501-4000	85	128	100	150	115	173	130	195	145	218	160	240	175	263
4001-5000	95	143	110	165	125	188	140	210	155	233	170	255	185	278
5001-6000	105	158	120	180	135	203	150	225	165	248	180	270	195	293
6001-7000	115	173	130	195	145	218	160	240	175	263	190	285	205	308
7001-8000	125	188	140	210	155	233	170	255	185	278	200	300	215	323
8001-9000	135	203	150	225	165	248	180	270	195	293	210	315	225	338
>9000	145	218	160	240	175	263	190	285	205	308	220	330	235	353

¹ For residences that exceed 8 bedrooms, increase the minimum requirement listed for 8 bedrooms by an additional 15 CFM per bedroom. The maximum CFM is equal to 1.5 times the minimum.

² For single family homes, ventilation rates are based on the total floor area of conditioned space. In multifamily buildings, ventilation rates for each unit are based on the total floor area of conditioned space in each unit. Conditioned space is defined in Chapter 2.

Section 7. Table 4-D of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is amended as follows:

TABLE 4-D PRESCRIPTIVE INTEGRATED FORCED-AIR SUPPLY DUCT SIZING

((Number of Bedrooms)) Required Flow (CFM) Per Table 4-B	Minimum Smooth Duct Diameter	Minimum Flexible Duct Diameter	Maximum Length¹	Maximum Number of Elbows²
((2 or less)) 50-80	6"	7"	20'	3
((3)) 80-125	7"	8"	20'	3
((4 or more)) 115-175	8"	((9")) 10"	20'	3
170-240	9"	11"	20'	3

¹ For lengths over 20 feet increase duct diameter 1 inch.

² For elbows numbering more than 3 increase duct diameter 1 inch.

Section 8. Table 4-F is added to the 1997 Seattle Mechanical Code as follows:

TABLE 4-F PRESCRIPTIVE SUPPLY FAN DUCT SIZING

Supply Fan Tested CFM At 0.4" WG		
Specified volume from Table 4-B	Minimum Smooth Duct Diameter	Minimum Flexible Duct Diameter
50-90 CFM	4"	5"
90-150 CFM	5"	6"
150-250 CFM	6"	7"
250-400 CFM	7"	8"

Section 9. Subsection 507.10 of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is amended as follows:

507.10 Clearances. Exposed grease duct systems serving a Type I hood shall have a clearance from unprotected combustible construction of at least 18 inches (457 mm). This clearance may be reduced to not less than 3 inches (76 mm), provided the combustible construction is protected ~~((with material required for one hour fire resistive construction))~~ as required by Table 3-B.

Section 10. Subsection 507.13 of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is amended as follows:

507.13 Makeup Air for Commercial Kitchen Hoods. A separate makeup air system shall be provided for the kitchen which supplies not less than 90 percent of the air to be exhausted.

EXCEPTIONS: 1. Where the total makeup air for a system is less than 400 cfm((-)); or
2. Where hoods are used to exhaust ventilation air that would otherwise exfiltrate or be exhausted by other fan systems and there is a direct path for air to flow from an area supplied with ventilation air to the kitchen hood.

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Note: Examples of common situations in which exception 2 may apply include the following: 1. A commercial kitchen hood is located in or adjacent to an atrium space and the atrium is supplied with a high volume of ventilation air needing to be exhausted. An unobstructed path exists for the ventilation air to flow from the atrium space to the kitchen hood, which allows the atrium ventilation air to be used as the kitchen hood make-up air. 2. Other applications might include restaurants where the ventilation air of the kitchen and seating areas can freely mix and there is an ample amount of required ventilation air being supplied to the seating area to also supply makeup air for the commercial kitchen hood.

Makeup diffusers shall be located to prevent a short-circuiting of air furnished to the exhaust system. The makeup air system shall be capable of heating the air supplied to the space to a minimum of 65°F (18°C), if the amount of makeup air exceeds 2500 cfm (1180 L/s) per space. Exterior windows and doors shall not be used for the purpose of providing makeup air. The exhaust and makeup air systems shall be connected by an electric cross-interlocking switch.

Section 11. Subsection 508.1 of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is amended as follows:

508.1 Where Hoods Are Required. Hoods shall be installed at or above all commercial-type deep fat fryers, broilers, fry grills, steam-jacketed kettles, hot-top ranges, ovens, barbecues, rotisseries, dishwashing machines above 140°F (60°C) maximum water temperature and similar equipment which produce comparable amounts of steam, smoke, grease or heat in a food-processing establishment. For the purpose of this section a food-processing establishment shall include any building or portion thereof used for the processing of food but shall not include a dwelling unit.

EXCEPTION: Residential-type equipment installed in offices, churches, nursing homes, congregate residences, boarding homes and similar occupancies (~~(with a capacity of not more than 50 persons and with kitchens and dining rooms designed to serve not)~~) serving no more than 150 meals per day.

Interpretation: The table below summarizes the types of hoods which are required for different types of appliances. The building official has determined that the appliances for which no hood is required do not produce amounts of steam, smoke, grease or heat comparable to the equipment listed in Section 508.1.

TYPE OF APPLIANCE ¹	TYPE OF HOOD REQUIRED ²		
	TYPE I	TYPE II	NONE
Baking oven		> 6 kW	≤ 6 kW
Charbroiler	All sizes		
Coffee maker		> 6 kW	≤ 6 kW
Coffee roaster		> 6 kW	≤ 6 kW
Deep-fat fryer	All sizes		
Dishwasher		> 140° F	≤ 140° F
Grill	All sizes		

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TYPE OF APPLIANCE ¹	TYPE OF HOOD REQUIRED ²		
	TYPE I	TYPE II	NONE
Hot dog display heater		> 6 kW	≤ 6 kW
Microwave oven			All sizes
Pastry oven		> 6 kW	≤ 6 kW
Pizza oven		> 6 kW	≤ 6 kW
Popcorn maker		> 6 kW	≤ 6 kW
Roasting oven ³	> 6 kW	≤ 6 kW	
Roll warmer		> 6 kW	≤ 6 kW
Solid-fuel-burning appliances	All sizes and all food products		
Soup warmer, soup preparation cooking unit		> 6 kW	≤ 6 kW
Steam reconstitution device		> 6 kW	≤ 6 kW
Steam table		> 6 kW	≤ 6 kW
Steamer		> 6 kW	≤ 6 kW
Toaster		> 6 kW	≤ 6 kW
Warming oven		> 6 kW	≤ 6 kW
<p>¹ The building official shall determine hood requirements for appliances not listed in the table.</p> <p>² Section 507.2 defines the types of kitchen hoods as follows. Type I Hood is a kitchen hood for collecting and removing grease and smoke generated from equipment such as deep fryers, charbroilers, grills and roasting ovens. Type II Hood is a general kitchen hood for collecting and removing steam, vapor, heat or odors generated from equipment such as steamers, pastry ovens, pizza ovens and coffee roaster ovens and roasting ovens of maximum 6 kW (20,000 Btu/h) capacity.</p> <p>³ Roasting ovens are used to cook raw or partially cooked food.</p>			

508.1.1 Hoods larger than 5,000 cfm. Individual hoods capable of exhausting more than 5,000 cfm of air shall be canopy-type compensating hoods and shall be provided with makeup air sized for at least 50 percent of exhaust air volume that is: (a) unheated or heated to no more than 60°F (16°C); and (b) uncooled or cooled without the use of mechanical cooling.

EXCEPTION: Where hoods are used to exhaust ventilation air that would other exfiltrate or be exhausted by other fan systems and there is a direct path for air to flow from an area supplied with ventilation air to the kitchen hood.

Note: Examples of common situations in which this exception may apply include the following: 1. A commercial kitchen hood is located in or adjacent to an atrium space and the atrium is supplied with a high volume of ventilation air needing to be exhausted. An unobstructed path exists for the ventilation air to flow from the atrium space to the kitchen hood, which allows the atrium ventilation air to be used as the kitchen hood make-up air. 2. Other applications might include restaurants where the ventilation air of the kitchen and seating areas can freely mix and there is an ample amount of required ventilation air being supplied to the seating area to also supply makeup air for the commercial kitchen hood.

See Section 508.11 for additional requirements for compensating hoods. See also Section 1439 of the 2000 Washington State Energy Code.

Section 12. Section 901 of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is amended as follows:

SECTION 901 — DECORATIVE APPLIANCES, DECORATIVE GAS APPLIANCES FOR INSTALLATION IN SOLID-FUEL-BURNING FIREPLACES AND GAS-FIRED LOG LIGHTERS

901.1 Decorative Appliances. Vented decorative appliances shall be installed in accordance with the manufacturer's installation instructions.

Note: Unvented decorative appliances are not approved for use in Seattle.

901.2 Decorative Gas Appliances for Installation in Solid-fuel-burning Fireplaces. In addition to the general requirements specified in Section 309, approved gas logs may be installed in solid-fuel-burning fireplaces, provided:

1. The gas log is installed in accordance with the manufacturer's installation instructions.
2. If the fireplace is equipped with a damper, it shall be permanently blocked open to a sufficient amount to prevent spillage of combustion products into the room.
3. The minimum flue passageway shall be not less than 1 square inch per 2,000 Btu/h input (1.09 mm²/W).
4. Gas logs, when equipped with a pilot, shall have a listed safety shutoff valve.

901.3 Gas-fired Log Lighters. Approved gas-fired log lighters shall be installed in accordance with the manufacturer's installation instructions.

5. The fireplace is provided with tight fitting metal or ceramic glass doors.
6. A source of primary combustion air is supplied directly to the decorative gas appliance from outside the structure, connected to the appliance as per the manufacturer's specification. The combustion air duct shall be either 4 inches (102 mm) or greater in diameter, or be sized according to manufactures specifications; shall not exceed 20 feet in length; and shall be installed as per manufacturer's instructions.

901.3 Gas-fired Log Lighters. Approved gas-fired log lighters shall be installed in accordance with the manufacturer's installation instructions.

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Section 13. Subsection 1312.20 of the 1997 Seattle Mechanical Code, as adopted by Ordinance 119080, is hereby repealed.

Section 14. This ordinance shall take effect and be in force thirty (30) days from and after its approval by the Mayor, but if not approved and returned by the Mayor within ten (10) days after presentation, it shall take effect as provided by Seattle Municipal Code Section 1.04.020.

Section 15. Severability. The several provisions of this ordinance are declared to be separate and severable and the invalidity of any clause, sentence, paragraph, subdivision, section subsection, or portion of this ordinance, or the invalidity of the application thereof to any person or circumstance, shall not affect the validity of the remainder of this ordinance or the validity of its application to other persons or circumstances.

Passed by the City Council the ____ day of _____, 2001, and
signed by me in open session in authentication of its passage this ____ day of
_____, 2001.

President Pageler of the City Council

Approved by me this ____ day of _____, 2001.

Paul Schell, Mayor

Filed by me this ____ day of _____, 2001.

City Clerk

(SEAL)